

CARGO SUMMARY		MISSION SEQUENCE: 1	STS-1	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
10,823	-0-	10,823		
<u>DEPLOYABLE PAYLOADS:</u> None			<u>CREW COMPARTMENT PAYLOAD:</u> None	
<u>ATTACHED PLB PAYLOADS:</u> 1. Passive Sample Array 2. DFI (Development Flight Instrumentation) Pallet , 9,290 lb 3. ACIP (Aerodynamic Coefficient Identification Package)			<u>SPECIAL PAYLOAD MISSION KITS:</u> None Note: RMS NOT FLOWN	

CARGO SUMMARY		MISSION SEQUENCE: 2	STS-2	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
18,778	-0-	18,778		
<u>DEPLOYABLE PAYLOADS:</u> None			<u>CREW COMPARTMENT PAYLOAD:</u> None	
<u>ATTACHED PLB PAYLOADS:</u> 1. OFT (Orbital Flight Test) Pallet a. MAPS (Measurement of Air Pollution from Satellite) b. SMIRR (Shuttle Multispectral Infrared Radiometer) c. SIR (Shuttle Imaging Radar) d. FILE (Features Identification and Location Experiment) e. OCE (Ocean Color Experiment) 2. DFI (Development Flight Instrumentation) Pallet 11,048 lb 3. ACIP (Aerodynamic Coefficient Identification Package) 4. IECM (Induced Environment Contamination Monitor) 5. OSTA-1 (Office of Space and Terrestrial Application) 5,395 lb			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS (Remote Manipulator System) S/N 201	

CARGO SUMMARY		MISSION SEQUENCE: 3	STS-3	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> Verification Canister	
22,710	344*	22,170		
<u>DEPLOYABLE PAYLOADS:</u> * Plasma Diagnostic Package (PDP) Deployed Retrieved and Berthed Wt.= 344 lb (See RMS section)			<u>CREW COMPARTMENT PAYLOAD:</u> 1. MLR (Monodisperse Latex Reactor) 2. HBT (Heflex Bioengineering Test)	
<u>ATTACHED PLB PAYLOADS:</u> 1. OSS (Office of Space Science)-1 Pallet (8,740 lb) a. Plant Lignification Experiment b. Plasma Diagnostic Package* c. Vehicle Charging and Potential d. Space Shuttle Induced Atmosphere e. Thermal Canister f. Solar Flare X-ray Polarimeter g. Solar Ultraviolet and Spectral Irradiance Monitor h. Contamination Monitor Package i. Foil Microabrasion Package 2. DFI Pallet, 11,048 3. ACIP 448 lb *RMS deployed/berthed			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS - S/N 201	

CARGO SUMMARY		MISSION SEQUENCE: 4	STS-4	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> 1. Utah State University a. Drosophila Melanogaster (fruit fly) Growth Experiment b. Artemia (Brine Shrimp) Growth Experiment c. Surface Tension Experiments d. Composite Curing Experiment e. Thermal Conductivity Experiment f. Microgravity Soldering Experiment g. Root Growth of Lemna Minor L. (Duckweed) in Microgravity h. Homogeneous Alloy Experiment i. Algal Microgravity Bioassay Experiment	
11,644	816	11,644		
<u>DEPLOYABLE PAYLOADS:</u> IECM (Induced Environment Contamination Monitor) deployed/reberthed by RMS Deployed and Berthed Wt. = 816 lb (See RMS section)			<u>CREW COMPARTMENT PAYLOAD:</u> 1. MLR (Monodisperse Latex Reactor) 2. CFES (Continuous Flow Electrophoresis System) 3. SSIP (Shuttle Student Involvement Program) S404: Effect of Prolonged Space Travel on Levels of Trivalent Chromium in the Body S405: Effect of Diet, Exercise and Zero Gravity on Lipoprotein Profiles 4. VPCF (Vapor Phase Compression Freezer)	
<u>ATTACHED PLB PAYLOADS:</u> DFI Pallet, 9,900 lb			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS (Remote Manipulator System) S/N 201	
<u>DEPARTMENT OF DEFENSE</u> DOD 82-1				

CARGO SUMMARY		MISSION SEQUENCE: 5	STS-5	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> G-026: ERNO/Stability Of Metallic Dispersions. (JSC PIP 14021)	
20,830	14,585	6,245		
<u>DEPLOYABLE PAYLOADS:</u> 1. SBS-C/PAM-D (Satellite Business Systems/Payload Assist Module) Deployed Wt = 7,211 lb 2. ANIK-C/PAM-D - TELESAT Canada, Ltd/Payload Assist Module Deployed Wt = 7,374 lb			<u>CREW COMPARTMENT PAYLOAD:</u> SSIP (Shuttle Student Involvement Program) a. SE81-5 - Crystal Formation In Zero Gravity b. SE81-9 - Convection In Zero Gravity c. SE81-2 - Growth Of Porifera	
<u>ATTACHED PLB PAYLOADS:</u> DFI (Development Flight Instrumentation) a. EIOM (Effects of Interaction of Oxygen with Materials) b. ISAL (Investigation of STS Atmospheric Luminosities)			<u>SPECIAL PAYLOAD MISSION KITS:</u> Mission Specialist Seats (2) Note: RMS NOT FLOWN	

CARGO SUMMARY		MISSION SEQUENCE: 6	STS-6	ORBITER OV-099
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> 1. G-005: Asahi Shimban, Japan 2. G-049: U. S. Air Force Academy 3. G-381: Park Seed Company	
46,662	37,546	9,116		
<u>DEPLOYABLE PAYLOADS:</u> TDRS-A/IUS (Tracking and Data Relay Satellite/Inertial Upper Stage) Deployed Wt = 37,546 lb			<u>CREW COMPARTMENT PAYLOAD:</u> 1. CFES 2. MLR 3. RME (Radiation Monitoring Experiment) 4. NOSL (Night/Day Optical Survey Of Lightning)	
<u>ATTACHED PLB PAYLOADS:</u> CBSA (Cargo Bay Stowage Assembly)			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. Mini-MADS 2. EMU (Extravehicular Mobility Unit) Note: RMS NOT FLOWN	

CARGO SUMMARY		MISSION SEQUENCE: 7	STS-7	ORBITER OV-099
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> 1. G-033: California Institute of Tech.-.Plant Gravireception and Liquid Dispersion 2. G-088: Edsyn, Inc. - Soldering of Material 3. G-002: Kayser Threde, W. Germany - Youth Fair Experiment 4. G-009: Purdue University - Geotropism Fluid Dynamics and Nuclear Particle Velocity 5. G-305: U. S. Air Force and National Research Labs- Ultraviolet Spectrometer 6. G-012: RCA, Camden, NJ, Schools - Ant Colony 7. G-345: Goddard Space Flight Center and National Research Labs - Payload Bay Environment	
31,893	14,949	16,944		
<u>DEPLOYABLE PAYLOADS:</u> 1. ANIK-C/PAM-D: TELESAT Canada Satellite Deployed Wt = 7,374 lb 2. PALAPA-B1/PAM-D: Indonesian Satellite Deployed Wt = 7,575 lb 3. SPAS (Shuttle Pallet Satellite)-01 Unberthing/Berthing Tests Deployed and Retrieved Wt. = 3,192 lb (See RMS Section)			<u>CREW COMPARTMENT PAYLOAD:</u> 1. CFES 2. MLR 3. SSIP	
<u>ATTACHED PLB PAYLOADS:</u> 1. OSTA (Office of Space and Terrestrial Applications)-2 2. CBSA			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS - S/N 201 2. TAGS (Text and Graphics System) 3. Mini-MADS	

CARGO SUMMARY		MISSION SEQUENCE: 8	STS-8	ORBITER OV-099
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> 1. U. S. Postal Service - 8 cans of philatelic covers 2. G-475: Asahi Shimbun - Artificial Snow Crystal Experiment 3. G-348: Office of Space Science - Atomic Oxygen Erosion 4. G-347: Navy Research Lab - Ultraviolet Photo Film 5. G-346: Goddard Space Flight Center - Cosmic Ray Upset Experiment	
25,790	7,445	22,631		
<u>DEPLOYABLE PAYLOADS:</u> 1. INSAT/PAM-D: Indian National Satellite Deployed Wt = 7,445 lb 2. PFTA (Payload Flight Test Article) Test Unberthing/Berthing Tests Deployed and Retrieved Wt = 7,350 lb			<u>CREW COMPARTMENT PAYLOAD:</u> 1. CFES 2. ICAT (Incubator-Cell Attachment Test) 3. ISAL (Investigation of STS Atmospheric Luminosities) 4. AEM (Animal Enclosure Module) - Evaluation of AEM using rats 5. RME 6. SSIP Biofeedback	
<u>ATTACHED PLB PAYLOADS:</u> 1. DFI (Development Flight Instrumentation) Pallet a. Oxygen Interaction and Heat Pipe Experiment b. Postal Covers (2 boxes) 2. CBSA 3. SPAS - 01 Umbilical Disconnect			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS - S/N 201 2. MADS 3. COMSEC (Communication Security) 4. TAGS	

CARGO SUMMARY		MISSION SEQUENCE: 9	STS-9	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
33,131	-0-	33,131		
<u>DEPLOYABLE PAYLOADS:</u> None			<u>CREW COMPARTMENT PAYLOAD:</u> None	
<u>ATTACHED PLB PAYLOADS:</u> 1. Spacelab-1: a. Spacelab Long Module b. Spacelab Pallet c. Tunnel d. Tunnel Extension e. Tunnel Adapter 2. Experiments (73) a. Astronomy and Physics (6) b. Atmospheric Physics (4) c. Earth Observations (2) d. Life Sciences (16) e. Materials Sciences (39) f. Space Plasma Physics (5) g. Technology (1)			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. Cryogenic sets 4 and 5. 2. Spacelab utility kit 3. TAGS 4. Galley Note: RMS NOT FLOWN	

CARGO SUMMARY		MISSION SEQUENCE: 10	STS-41-B	ORBITER OV-099
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> 1. G-004: Utah State University/Aberdeen University 2. G-008: Utah State University/University of Utah/ Brighton High School 3. G-051: General Telephone Labs 4. G-309: U. S. Air Force 5. G-349: Goddard Space Flight Center (re: flight STS-8)	
28,252	15,073	13,179		
<u>DEPLOYABLE PAYLOADS:</u> 1. WESTAR VI/PAM-D - Western Union Communications Satellite/Payload Assist Module Deployed Wt = 7,307 lb 2.. PALAPA-B/PAM-D - Indonesian Communications Satellite/Payload Assist Module Deployed Wt = 7,556 lb 3. SPAS - 01 - Not deployed due to RMS anomaly 4. IRT (Integrated Rendezvous Target) - Failed to inflate due to internal failure Deployed Wt =210			<u>CREW COMPARTMENT PAYLOAD:</u> 1. ACES (Acoustic Containerless Experiment System) 2. IEF (Isoelectric Focusing) 3. Cinema 360 Camera 4. Student Experiment SE81-10 - Effects of Zero g on Arthritis 5. MLR 6. RME	
<u>ATTACHED PLB PAYLOADS:</u> 1. MFR (Manipulator Foot Restraint) 2. SESA (Special Equipment Stowage Assembly) 3. Cinema 360 - High Quality Motion Picture Camera			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS - S/N 201 2. MMU (Manned Maneuvering Unit) - 3. Mini-MADS 4. Galley	

CARGO SUMMARY		MISSION SEQUENCE: 11	STS-41-C	ORBITER OV-099
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
33,831	21,396	12,435		
<u>DEPLOYABLE PAYLOADS:</u> 1. LDEF (Long Duration Exposure Facility) - Office of Aeronautics and Space Technology Deployed Wt = 21,396 lb 2. SMM (Solar Maximum Mission) Spacecraft Rendezvous/Retrieve/Repair/Deploy Retrieve/Repair/Deploy Wt - 4740 lb (See Other Payloads Section)			<u>CREW COMPARTMENT PAYLOAD:</u> 1. RME 2. IMAX Camera - Canadian Commercial Company color film camera using 70mm x 280mm film 3. SSIP Comparison of honeycomb structure of bees in low g and bees in 1 g	
<u>ATTACHED PLB PAYLOADS:</u> 1. SMRM (Solar Maximum Repair Mission) - Flight Support System 2. Cinema 360 - High quality motion picture camera CBSA (Cargo Bay Storage Assembly bay 2 starboard side			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. MMU - 2 2. EMU (Extravehicular Mobility Units) - 3 3. RMS - S/N 302 4. MFR 5. Galley	

CARGO SUMMARY		MISSION SEQUENCE: 12	STS-41-D	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
41,382	30.086	11,296		
<u>DEPLOYABLE PAYLOADS:</u> 1. SBS/PAM-D (Satellite Business System/Payload Assist Module) Deployed Wt = 7,383 2. SYNCOM IV-2 (Leased to DOD for UHF and SHF communications, also called LEASAT) Deployed Wt = 15,196 lb 3. TELSTAR/PAM-D (American Telephone & Telegraph/Payload Assist Module) Deployed Wt = 7,507			<u>CREW COMPARTMENT PAYLOAD:</u> 1. CFES III (Continuous Flow Electrophoresis System) 2. IMAX Camera - IMAX System Corporation (Canadian Company) 70mm x 280mm film 3. RME - USAF Space Div. 4. Clouds - USAF Nikon F 3/T with 105mm lens 5. SSIP - (Shuttle Student Involvement Package) grow single crystal of Indium, Shawn Murphy, Hiram, Ohio; Rockwell International, Sponsor.]	
<u>ATTACHED PLB PAYLOADS:</u> OAST-1 (Office of Application and Space Technology) a. SAE (Solar Array Experiment) b. DAE (Dynamic Augmentation Experiment) c. SCCF (Solar Cell Calibration Facility)			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS - S/N 301 2. MADS	

CARGO SUMMARY		MISSION SEQUENCE: 13	STS-41-G	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> 1. G007: Alabama Space and Rocket Center Solidification of lead-antimony; and aluminum copper student experiment 2. G032: ASAHI National Broadcasting Corp., Japan Surface tension and viscosity; and materials experiment 3. G306: Air Force and U. S. Naval Research Laboratory Low Energy Heavy Ions Search in the Inner Magnetosphere 4. G469: Goddard Space Flight Center - Cosmic Ray Upset Experiment (CRUX) 5. G038: Marshall-McShane Vapor Deposition of Metals and Non-Metals 6. G074: McDonnell Douglas Company Study Proposed Propellant Acquisition System 7. G013: Kayser Threde, West Germany Verify Transport Mechanism in Halogen Lamps Performance in Extended Micro-g 8. G518: Utah State University Study Solar Flux Separation, Capillary Waves on Water Surface, and Thermo-Capillary Flow in Liquid Columns	
17,592	4,949	12,643		
<u>DEPLOYABLE PAYLOADS:</u> 1. ERBS (Earth Radiation Budget Satellite) Deployed Wt = 4,949 lb.				
<u>ATTACHED PLB PAYLOADS:</u> 1. OSTA-3 (Office of Space and Terrestrial Applications) a. SIR-B (Shuttle Imaging Radar) b. FILE (Feature Ident. and Location Exp.) c. MAPS (Measurement of Air Pollution from Satellite) 2. LFC (Large Format Camera) ORS (Orbital Refueling System)				
<u>CREW COMPARTMENT PAYLOAD:</u> 1. APE (Auroral Photography Experiment) 2. CANEX (Canadian Experiments) a. VISET b. ACOMEX c. OGLOW (Orbital Glow & Atmospheric Emissions) d. SPEAM (Sun Photometer Earth Atmosphere Measurement) e. SASSE (Space Adaptation Syndrome Studies Exp) 4. RME 5. TLD (Thermoluminescent Dosimeter)			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS - S/N 302 2. Galley 3. EMU - (3) 4. PSA (Provisions Stowage Assembly)	

CARGO SUMMARY		MISSION SEQUENCE: 14	STS-51-A	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
38,003	22,764	17,620		
<u>DEPLOYABLE PAYLOADS:</u> 1. TELESAT-H (ANIK)-D2/PAM-D - Canadian 24 channel communications satellite. PAM D is a payload assist module built by McDonnell Douglas Deployed weight: 7,574 lb 2. SYNCOM IV-1 - Synchronous Communication Satellite, also called LEASAT, leased to U. S. Navy. 2) Deployed weight: 15,190 lb			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS - S/N 301 2. MMU (2) 3. EMU (3) 4. PSA Restraint (2) 5. Satellite Retrieval Hardware: a. Modified Spacelab pallet (2) b. MFR (Manipulator Foot Restraint) c. Stinger Adapter (2) d. Satellite Adapter Trunnion (2) e. Berthing A Frame (2)	
<u>RETRIEVED PAYLOADS</u> 1. PALAPA-B2 - Deployed during mission STS 41-B, failed to achieve proper transfer orbit due to PAM-D failure Retrieved weight: 1,262 lb 2. WESTAR-VI - Deployed during mission STS 41-B, failed to achieve proper transfer orbit due to PAM-D failure. Retrieved weight: 1,119 lb				
<u>CREW COMPARTMENT PAYLOAD:</u> 1. DMOS (Diffusive Mixing of Organic Solutions) 3M Corp. 2.. RME				

CARGO SUMMARY		MISSION SEQUENCE: 15	STS-51C	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> Data not available DOD Classified Mission	
10,823	-0-	10,823		
<u>DEPLOYABLE PAYLOADS:</u> Data not available, DOD Classified Mission			<u>CREW COMPARTMENT PAYLOAD:</u> Data not available, DOD Classified Mission	
<u>ATTACHED PLB PAYLOADS:</u> Data not available, DOD Classified Mission			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS - S/N 301 Other data not available, DOD Classified Mission	

CARGO SUMMARY		MISSION SEQUENCE: 16		STS-51D	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB		<u>GAS (Getaway Special):</u> 1. G-035 - Asahi National Broadcasting Corporation, Japan a. Surface tension and viscosity b. Alloy, lead oxide and carbon fiber 2. G-471 - Goddard Space Flight Center, Thermal Engineering Branch Capillary Pump Loop (CPU) Priming Experiment	
28,747	22,576	6,171			
<u>DEPLOYABLE PAYLOADS:</u> SYNCOM IV-3 Synchronous Communication Satellite, built by Hughes, third in a series of 4, leased to the Navy Failed to activate after nominal deploy from Orbiter Deploy wt: 15,190 TELESAT-I (ANIK C-1)/PAM D - Canadian communication Placed in three year storage orbit Deployed wt: 7,386 lb				<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS - S/N 301 2. PSA 3. MADS III	
<u>ATTACHED PLB PAYLOADS:</u> None					
<u>CREW COMPARTMENT PAYLOAD:</u> 1. CFES-III 2. AFE (American Flight Echocardiograph) satellite. 3. PPE (Phase Partitioning Experiment) 4. SSIP (2) a. Corn Statolith b. Brain Cell					

CARGO SUMMARY		MISSION SEQUENCE: 17	STS-51-B	ORBITER OV-099
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> G-010 NUSAT, Northern Utah Satellite Weber State College, Utah Utah State University, and New Mexico State University. First successful payload ejection from a GAS canister Deployment Wt = 105 lb	
30,748	105	30,643		
<u>DEPLOYABLE PAYLOADS:</u> Refer to GAS section			G-303 GLOMR, Global Low Orbiting Message Relay Satellite Defense Systems Inc., McLean, Va Failed to eject from GAS canister	
<u>ATTACHED PLB PAYLOADS - Spacelab 3:</u> Materials Processing in Space: 1. Solution Growth of Crystals in Zero Gravity 2. Mercuric Iodide Crystal Growth, Vapor Crystal Growth System (VCGS) 3. Mercury Iodide Crystal Growth (MICG) Technology 1. Dynamics of Rotating and Oscillating Free Drops (DROP) Environmental Observations 1. Geophysical Fluid Flow Cell Experiment (GFFC) 2. Atmospheric Trace Molecule Spectroscopy (ATMOS) 3. Very Wide Field Galactic Camera (VWFGC) 4. Aurora Observation Astro Physics 1. Studies of the Ionization States of Solar and Galactic Cosmic Ray Heavy Nuclei (ION) Life Sciences 1. Research Animal Holding Facility (RAHF) 2. Urine Monitoring Investigation (UMI) 3. Autogenic Feedback Training (AFT)			<u>CREW COMPARTMENT PAYLOAD:</u> UMS: Urine Monitoring System <u>SPECIAL PAYLOAD MISSION KITS:</u> 1. Airlock 2. Long Transfer Tunnel 3. Galley 4. MPES - Mission Peculiar Equipment Support Structure, carried ATMOS & ION Note: RMS NOT FLOWN	

CARGO SUMMARY		MISSION SEQUENCE: 18	STS-51-G	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> G-007: Alabama Space & Rocket Center/Marshall Amateur Radio Club 1. Solidification of Metals 2. Crystal Growth 3. Radish Seed Root Study 4. Radio Transmission Experiment G-025: ERNO - Dynamic Behavior of Liquid Propellants in low-g. G-027: DFVLR of West Germany - Slipcasting in micro-g. G-028: DFVLR of West Germany - Manganese Bismuth production in micro-g G-034: Dickshire Coors, Texas High Students 12 Biological/physical science experiments 1 Microprocessor controller G-314: USAF and USNRL - SURE (Space Ultra- violet Radiation Environment)	
38,258	22,832	15,426		
<u>DEPLOYABLE PAYLOADS:</u> 1. TELSTAR-3D/PAM-D: Hughes 376 Comm Satellite with McDac Payload Assist Module Booster. Owned by AT&T Co Wt. = 7,546.0 2. ARABSAT-A/PAM-D: Aerospatiale Comm Satellite with McDac Payload Assist Module Booster. Owned by Saudi Arabian Communications Organization.. Wt. = 7,695.0 lb 3. MORELOS-A/PAM-D: Hughes 376 Comm Satellite with McDac Payload Assist Module Booster. Owned by Mexican Communications and Transportation Wt. = 7,591.0 lb 4. SPARTAN-101: Shuttle Pointed Autonomous Tool for Astronomy SFSS: Spartan Flight Support Structure REM: Release/Engage Mechanism SEC: Scientific Experiment Carrier The SEC was released and retrieved using REM and RMS Deployed and retrieved Wt = 2,217.0 lb			<u>CREW COMPARTMENT PAYLOAD:</u> ADSF (Automated Directional Solidification FEE (French Echocardiograph Experiment) FPE (French Postural Experiment) HPTE (High Precision Tracking Experiment)	
<u>ATTACHED PLB PAYLOADS:</u> None			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS - S/N 301 Galley	

CARGO SUMMARY		MISSION SEQUENCE: 19	STS-51-F	ORBITER OV-099
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED RETRIEVED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
33,012	628	33,012		
<u>DEPLOYABLE PAYLOADS:</u> Ejectable Plasma Diagnostic Package, Exp No. 3 second flight of PDP (STS-3 first flight First flight as a free flyer to sample plasma from the Shuttle Deployed/Retrieved Wt = 628.0 lb			<u>CREW COMPARTMENT PAYLOAD:</u> 0 Life Sciences °Vitamin D Metabolites and Bone Demineralization (Exp 1) °The Interaction of Oxygen and Gravity Induced Lignification (Exp 2) °Shuttle Amateur Radio Experiment (SAREX) °Dispenser Technology Experiment - Dispensing carbonated Beverages In Micro-g °Protein Crystal Growth	
<u>ATTACHED PLB PAYLOADS</u> Spacelab 2 0 Plasma Physics ° Deployable/Retrievable Plasma Diagnostic Package (PDP) (Exp 3) ° Plasma Depletion Experiments for Ionospheric and Radio Astronomical Studies (Exp 4) ° Vehicle Charging and Potential (VCAP) (Exp 14) 0 Astrophysical Research ° Small Helium Cooled Infrared Telescope (IRT) (Exp 5) ° Hard X-ray Imaging of Clusters of Galaxies and Other Extended X-ray Sources (XRT) (Exp 7) ° Elemental Composition and Energy Spectra of Cosmic Ray Nuclei (CRNE) (Exp 6) 0 Solar Astronomy ° Solar Magnetic and Velocity Field Measurement System (SOUP) (Exp 8) ° Coronal Helium Abundance Spacelab Experiment (CHASE) (Exp 9) ° High Resolution Telescope and Spectrograph (HRTS) (Exp 10) ° Solar Ultraviolet Spectral Irradiance Monitor (SUSIM) (Exp 11) 0 Technology Properties of Superfluid Helium Zero-g (SFHe) (Exp 13)			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS - S/N 302 Galley	

CARGO SUMMARY		MISSION SEQUENCE: 20	STS-51-I	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
38,884	30,259	8,595		
<u>DEPLOYABLE PAYLOADS:</u> ASC-1/PAM-D - American Satellite Company, first of two satellites built by RCA and owned by a partnership between Fairchild Industries and Continental Telecon Inc. PAM-D Payload Assist Module built by McDonnell Douglas. "D" indicates used for lightweight satellites less than 2,250 lb Deployed Wt. = 7,591 lb AUSAT-1/PAM-D - Australian Communications Satellite, owned by AUSAT Proprietary Ltd., built by Hughes Communications International, Model HS376 Deployed Wt. = 7,508 lb SYNCOM IV-4 - Synchronous Communication Satellite - Last in a series of 4 satellites built by Hughes Communication Services and leased to the U. S. Navy. Referred to as LEASAT when deployed. Failed to function after reaching correct geosynchronous orbit. Deployed Wt. = 15,190 lb			<u>CREW COMPARTMENT PAYLOAD:</u> PVTOS - Physical Vapor Transport Organic Solid Experiment, 3M Corporation	
<u>ATTACHED PLB PAYLOADS:</u> None			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS - S/N 301 2. Galley 3. LEASAT-3 Salvage Equipment LEASAT-3 was successfully retrieved repaired and redeployed Retrieved and redeployed weight = 15,190 lb	

CARGO SUMMARY		MISSION SEQUENCE: 21	STS-51-J	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> Data not available, DOD Classified Mission	
<u>DEPLOYABLE PAYLOADS:</u> Data not available, DOD Classified Mission			<u>CREW COMPARTMENT PAYLOAD:</u> Data not available, DOD Classified Mission	
<u>ATTACHED PLB PAYLOADS:</u> Data not available, DOD Classified Mission			<u>SPECIAL PAYLOAD MISSION KITS:</u> Data not available, DOD Classified Mission	

CARGO SUMMARY		MISSION SEQUENCE: 22	STS-61-A	ORBITER OV-099
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	Mono-ellipsoid Mirror Heating Facility High Precision Thermostat Facility 4. BW-Biowissenschaften: Experiments relating to Life Sciences. Experiments include: Biological (1) Medical (2) Botanical (3) 5. VS-Vestibular Sled: Experiments in Life Science regarding visio-vestibular coordination system and sensory perception process. Experiment facilities include: Mechanically accelerated sled Instrumented helmet 6. BR-Biorack: Multi-purpose facility for biological research in cell development physiology, cell fertilization and radiobiology. Facilities include: 2 Incubators Cooler freeze Glove box 7. NX-NAVEX: Navigation Experiment; located in payload bay attached to USS (unique support structure). 8. ME-MEA Materials Experiment Assembly; mounted on USS containing three materials processing experiments.	
30, 519	150	30, 369		
<u>DEPLOYABLE PAYLOADS:</u> GLOMR - Global Low Orbiting Message Relay Satellite. Built by Defense Systems Inc., for DARPA. First launch attempt was on STS 51-B which failed. Deployed from GAS canister. Deployed Wt = 150 lb				
<u>ATTACHED PLB PAYLOADS:</u> Spacelab D-1 - First completed Spacelab mission under German Mission Management. Joint control by BMFT (Federal Ministry of Research and Technology) and DFVLR (Deutsche Forschungs-und Versuchsanstalt FurLuft-und Raumfahrt). Experiment Facilities: 1. WL-Werkstoff Labor; experiments relating to metallurgy, crystal growth, glasses/ceramics, and fluid physics. Experiment facilities include: Mirror Heating Facility Isothermal Heating Facility Gradient Heating Facility High Temperature Thermostat Fluid Physics Module Cryostat 2. PK-Progresskammer; experiment relating to Bubble Transport Boundary Layer, and Transparent Media. Experiment facilities include: Holographic Interferometric Apparatus Marangoni Convection Boat Interdiffusion in Salt Melt 3. MD-MEDEA: A material science double rack. Experiment facilities include: Gradient Heating Facility			<u>GAS (Getaway Special)</u> None	
			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. Airlock 2. Long Transfer 3. Galley 4. USS - Unique Support Structure 5. RMS - S/N 302.	

CARGO SUMMARY		MISSION SEQUENCE: 23	STS-61-B	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> G-479 Telesat-Canada a. Primary surface mirror production b. Metallic crystal production	
42,788	27,465	15,323		
<u>DEPLOYABLE PAYLOADS:</u> 1. MORELOS-B/PAM-D: Hughes 376 Comm Satellite with MDAC Payload Assist Module booster. Owned by Mexican Communications and Transportation Agency. Deployed Wt = 7,573 lb 2. AUSSAT-2/PAM D: Hughes 376 Comm Satellite with MDAC Payload Assist Module booster. Owned by AUSSAT Proprietary Ltd. Deployed Wt = 7,634 lb 3. SATCOM KU-2/PAM-D2: RCA built/owned 16 channel Ku-band communications satellite. First of four satellites. MDAC Payload Assist Module D2 is an updated version of the PAM-D used for heavier payloads. Deployed Wt = 12,258 lb			<u>CREW COMPARTMENT PAYLOAD:</u> 1. CFES: - Owned by McDonnell Douglas, separate biological samples using electrophoretic process. Third flight of this equipment. 2. DMOS: Diffusive Mixing of Organic Solutions Sponsored by 3M Corporation and used to study organic crystal growth/kinetics, test molecular orbital model and produce new materials for electro-optical applications with this equipment. 3. MPSE: Morelos Payload Specialist Experiments, includes experiments in transportation of nutrients inside bean plants, inoculation of group bacteria viruses, germination of three seed types and medical experiments testing internal equilibrium and volume change of the leg due to fluid shifts in zero-g. 4. OEX: Orbiter Experiments, an onboard experimental. A digital autopilot software package designed to provide precise stationkeeping capabilities between space vehicles.	
<u>ATTACHED PLB PAYLOADS:</u> 1. EASE: Experiment Assembly of Structures in Extravehicular Activity (EASE) a study of EVA dynamics and human factors in construction of structures in space. An inverted tetrahedron consisting of six 12-foot beams was constructed by EV-1 and EV-2. 2. ACCESS: Assembly Concept for Construction of Erectable Space Structures (ACCESS) is validation of ground - based timelines based on simulations. A 45 foot truss was assembled/disassembled by the two EV crew members. 3. ICBC: IMAX Cargo Bay Camera, joint effort between the Canadian IMAX Company and NASA, consists of a 70mm film camera in pressurized container used to document EASE/ACCESS operations.			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. Food Warmers (2), galley not flown 2. RMS - S/N 303 3. PSA (Provision Stowage Assembly)	

CARGO SUMMARY		MISSION SEQUENCE: 24		STS-61-C	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB		<u>GAS (Getaway Special) (continued)</u> 8. G-481: Unprimed, prepared linen and painted canvas reactions to space travel. Vertical Horizons. 9. G-062: 4 part experiment from Pennsylvania State University/General Electric. 10. G-449: JULIE (Joint Utilization of Laser Integrated Experiments). Four part experiment from St. Mary's Hospital, Milwaukee WI 11. G-332: 2 part experiment from Booker T. Washington Senior High School and High School for Engineering, Houston, TX. 12. G-310: USAF Academy experiment Note: Above 12 GAS canisters mounted on Gas Bridge carrier. 13. G-470: Experiment from GSFC and U.S. Dept of Agriculture.	
28,625	12,351	16,274			
<u>DEPLOYABLE PAYLOADS:</u> SATCOM KU-1/PAM D-2: RCA built/owned 16 channel Ku-Band communications satellite. Second of four satellites. MDAC Payload Assist Module <div>Deployment Wt. = 12,351.0 lb</div>				<u>CREW COMPARTMENT PAYLOAD:</u> 1. IBSE (Initial Blood Storage Experiment) package in 4 mid- deck lockers 2. CHAMP (Comet Halley Active Monitoring Program) uses cameras spectroscopic grating and filters to observe come through aft flight-deck overhead window. 3. HPCG (Handheld Protein Crystal Growth) experiment. 4. SSIP (Shuttle Student Involvement Program) a. SE83-4, Production of Paper Fiber in Space. b. SE83-6, Argon Injection as an Alternative to Honey combing.- c. SE82-19, Measurement of Auxin Levels and Starch Grains in Plant Roots	
<u>ATTACHED PLB PAYLOADS:</u> 1. MSL-2 (Materials Science Laboratory) consisting of MSL Carrier; MPE (Missile Peculiar Equipment), and 3 experiments a. 3AAL (3-Axis Acoustic Levitator) b. ADSF (Automated Directional Solidification Furnace) c. SEECM (Shuttle Environmental Effects of Coated Mirrors). 2. HITCHHIKER G-1: A Goddard Space Flight Center (GSFC) managed program consisting of 3 experiments a. PACS (Particle Analysis Camera for Shuttle) b. CPL (Capillary Pump Loop) c. SEECM (Shuttle Environment Effects of coated Mirrors) 3. IR-IE (Infrared - Imaging Experiment consisting of a RCA IR TV camera mounted in Orbiter CCTV pan/tilt unit.					
<u>GAS (Getaway Special):</u> 1. G-464: UVX (Ultraviolet Experiment) referred to as UCB (Univ. of Calif. at Berkley) contains a Bowyer UV spectrometer. GSFC experiment. 2. G-463: UVX, referred to as JHU (John Hopkins University) contains a Feldman Spectrophotometer. GSFC experiment. 3. G-462: UVX, referred to as GAP (GSFC Avionics Package) contains Telemetry System, Tape Recorder, and Battery. GSFC experiment 4. G-007: Alabama Space and Rocket Center/Marshall Amateur Club. Contains 3 student experiments and 1 radio transmission experiment. 5. G-446: HPLC (High Performance Liquid Chromatography) analytical columns All Tech Assoc. Inc 6. G-494: PHOTONS (Photometric Thermospheric Oxygen Night-glow Study). Canada Centre for Space Science, NRC of Can 7. Not numbered: EMP (Environmental Monitoring Package) measures the environment for GSFC.				<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. GAS Bridge Carrier 2. Galley Note: RMS NOT FLOWN	

CARGO SUMMARY		MISSION SEQUENCE: 25	STS-51-L	ORBITER OV-099
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>CREW COMPARTMENT PAYLOAD:</u> 1. Fluid Dynamics Experiment (FDE) Hughes Aircraft Company Experiment composed of six experiments: a. Fluid position and ullage b. Fluid motion due to spin c. Fluid self-inertia d. Fluid motion due to payload deployment. e. Energy dissipation due to fluid motion f. Fluid transfer 2. Comet Halley Active Monitoring Program (CHAMP), second flight. Phase Partitioning Experiment (PPE) dissolves two polymer solutions in water to observe their separation. Teacher in Space: Six experiments including hydroponic magnetism, Newton's laws, effervescence chromatography and simple machines. Shuttle Student Involvement Packages:	
48,633	N/A	N/A		
<u>DEPLOYABLE PAYLOADS:</u> 1. TDRS-B/IUS: Tracking and Data Relay Satellite/Inertial Upper Stage. Deployment Weight = 37,636 lb (IUS = 32,636, TDRS-B = 5000 lb) Non-deployable Weight = 5,603 lb 2. SPARTAN-203/Halley: Shuttle pointed Autonomous Research Tool for Astronomy/ Halley's Comet Experiment Deployable retrieval packages using RMS a. SPARTAN experiment package: 1) 2 UV Spectrometers from University of Colorado 2) 2 Nikon F-3 Cameras. 3) Optic Bench b. Halley's Comet Experiment; measure Halley's Comet composition/activity			SE82-4 "The effects of weightlessness on grain formation and strength in metals From: L. Bruce - St. Louis, MO Sponsor: McDonnell Douglas SE82-5 "Utilizing a semi-permeable membrane to direct crystal growth in zero gravity" From: S. Cavou Marlboro, NY Sponsor: Union College SE83-9 "Chicken embryo development in space From: J. Vellinger - Lafayette, In Sponsor: Kentucky Fried Chicken Corporation	
GAS (Getaway Special): None			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS - S/N 302 2. Galley 3. MADS	

CARGO SUMMARY		MISSION SEQUENCE: 26		STS-26	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	GAS (Getaway Special): None		
44,601	37,514	7,087	CREW COMPARTMENT PAYLOADS		
<u>DEPLOYABLE PAYLOADS:</u> 1. TDRS-C/IUS: Tracking and Data Relay Satellite/Inertial Upper Stage Deployable Wt = 37,514 lb (IUS = 32,877 lb TDRS-C = 4,637 lb Non-deployable Weight = 5,592 lb)			1. PVTOS - Physical Vapor Transport of Organic Solids, 3M Corporation; Second flight. 2. ADSF - Automated Directional Solidification Furnace, MSFC, Third flight, test material solidification in zero g 3. IRCFE - Infrared Communication Flight Experiment, JSC first flight; Test infrared transmitting crew headsets 4. PCG - Protein Crystal Growth, MSFC, flown four previous flights in less complicated configurations to examine growth of protein crystals in zero g. 5. IEF - Isoelectric Focusing, MSFC, second flight, test isoelectric transport through a permeable membrane in zero g. 6. PPE - Phase Partitioning Experiment, MSFC, second flight. Photograph fluid phase partitioning phenomena in zero g. 7. ARC - Aggregation of Red Blood Cells, MSFC & Australia, investigate aggregation characteristics of human red blood cells in zero g. 8. MLE - Mesoscale Lightning Experiment, MSFC, first flight, photograph atmospheric lightning activity from orbit. 9. ELRAD - Earth Limb Radiance Experiment, JSC, first flight, photograph earth limb radiance pre-sunrise/post-sunset. 10. Student Experiment SE82-4 - "Effects of weightlessness on Ti grain formation and strength". From L. Bruce St. Louis, Mo., sponsor: McDonnell-Douglas 11. Student Experiment SE82-5 - "Utilizing a semi-permeable membrane to direct crystal growth in zero gravity". From S. Cavou, Marlboro, N. Y., sponsor: Union College.		
<u>ATTACHED PLB PAYLOADS:</u> OASIS-1: Orbiter Experiment Autonomous Supporting Instrumentation System measures and records payload bay environmental data.			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. Galley 2. MADS Note: RMS NOT FLOWN		

CARGO SUMMARY		MISSION SEQUENCE: 27	STS-27	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> Data not available - DOD Classified Mission	
<u>DEPLOYABLE PAYLOADS:</u> Data not available - DOD Classified Mission			<u>CREW COMPARTMENT PAYLOAD:</u> Data not available - DOD Classified Mission	
<u>ATTACHED PLB PAYLOADS:</u> Data not available - DOD Classified Mission			<u>SPECIAL PAYLOAD MISSION KIT:</u> Data not available - DOD Classified Mission	

CARGO SUMMARY		MISSION SEQUENCE: 28	STS-29	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u>	
45,316	37,640	7,676		
<u>DEPLOYABLE PAYLOADS:</u> Tracking and Data Relay Satellite/Inertial Upper Stage (TDRS/IUS) one of four identical communication satellites providing support for STS and other customer TDRS weight = 4,950 lb. Total TDRS/IUS deployed weight = 37,546 lb			<u>CREW COMPARTMENT PAYLOAD:</u> 1. Protein Crystal Growth (PCG-111-1) Total weight = 90.7 lb 2. Chromosome and Plant Cell Division in Space (CHROMEX) Total weight = 89.0 lb 3. IMAX Camera Total weight = 313 lb 4. Air Force Maui Optical Site Calibration Test (AMOS) Total weight = 0 lb 5. Chicken Embryo Development (CHIX) in Space 6. Effects of Weightlessness on Bones (SSIP - 82-08) Total weight = 58 lb	
<u>ATTACHED PLB PAYLOADS:</u> 1. Space Station Heat Pipe Advanced Radiator Element (SHARE) 2. Orbiter Experiments Autonomous Supporting Instrumentation System (OASIS-1)			<u>SPECIAL PAYLOAD MISSION KITS:</u> Note: RMS NOT FLOWN	

CARGO SUMMARY		MISSION SEQUENCE: 29		STS-30	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None		
45,823	40,118	5,705			
<u>DEPLOYABLE PAYLOADS:</u> Unmanned, three-axis attitude-controlled exploration spacecraft containing systems required to achieve orbit of Venus and map its surface Deployable weight = 40,118 lb Non-deployable weight = 5,540 lb IUS = 32,525 lb Magellan = 7,593 lb Deployed: 125:01:01:01 G.m.t. SRM 1: 125:02:01:23 G.m.t. SRM 2: 125:02:06:28 G.m.t.			<u>CREW COMPARTMENT PAYLOAD:</u> 1. Fluids Experience Apparatus (FEA) FEA weight = 69 lb Total weight = 128 lb 2. Mesoscale Lightning Experiment (MLE) Total weight = 31 lb 3. Air Force Maui Optical Sight Calibration Test (AMOS) Total weight = 0 lb		
<u>ATTACHED PLB PAYLOADS:</u> None			<u>SPECIAL PAYLOAD MISSION KITS:</u> Note: RMS NOT FLOWN		

CARGO SUMMARY		MISSION SEQUENCE: 30		STS-28	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> Data not available - DOD Classified Mission		
<u>DEPLOYABLE PAYLOADS:</u> Data not available - DOD Classified Mission			<u>CREW COMPARTMENT PAYLOAD:</u> Data not available - DOD Classified Mission		
<u>ATTACHED PLB PAYLOADS:</u> Data not available - DOD Classified Mission			<u>SPECIAL PAYLOAD MISSION KITS:</u> Data not available - DOD Classified Mission		

CARGO SUMMARY		MISSION SEQUENCE: 31		STS-34	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> 1. Zero Gravity Growth of Ice Crystals		
45,905	38,323	7,582			
<u>DEPLOYABLE PAYLOADS:</u> 1. GALILEO/IUS, an unmanned spin-stabilized exploration spacecraft comprising a Jupiter orbiter and a Jupiter atmospheric entry probe mated to the IUS.			<u>CREW COMPARTMENT PAYLOAD:</u> 1. Polymer Morphology 2. Growth Horome Concentration and Distribution in Plants 3. Sensor Technology Experiment 4. IMAX Camera 5. Mesoscale Lightning Experiment 6. Air Force Maui Optical Site Calibration Test		
<u>ATTACHED PLB PAYLOADS:</u> 1. Shuttle Solar Backscatter Ultraviolet (SSBUV)			<u>SPECIAL PAYLOAD MISSION KITS:</u> None		

CARGO SUMMARY		MISSION SEQUENCE: 32	STS-33	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> Data not available - DOD Classified Mission	
<u>DEPLOYABLE PAYLOADS:</u> Data not available - DOD Classified Mission			<u>CREW COMPARTMENT PAYLOAD:</u> Data not available - DOD Classified Mission	
<u>ATTACHED PLB PAYLOADS:</u> Data not available - DOD Classified Mission			<u>SPECIAL PAYLOAD MISSION KITS:</u> Data not available - DOD Classified Mission	

CARGO SUMMARY		MISSION SEQUENCE: 33	STS-32	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
18,317	15,316	24,394	<u>CREW COMPARTMENT PAYLOAD:</u> 1. American Flight Echocardiograph (AFE) 2. Air Force Maui Optical Site Calibration Test (AMOS) 3. Characterization of Neurospora Circadian Rhythms (CNCR) 4. Fluids Experiment Apparatus 5. IMAX Camera 6. Latitude/Longitude Locator (L3) 7. Mesoscale Lightning Experiment (MLE) 8. Protein Crystal Growth (PCG)	
<u>DEPLOYABLE PAYLOADS:</u> SYNCOM IV-5, a geostationary communications satellite also known as LEASA leased to U.S. Navy Deployed weight: 15,316 lb			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS - S/N 201 2. Galley 3. MADS	
<u>ATTACHED PLB PAYLOAD:</u> None				
<u>RETRIEVED CARGO</u> LDEF, a non-powered space vehicle containing experiments. LDEF deployed on STS-41C Retrieved weight: 21,393 lb				

CARGO SUMMARY		MISSION SEQUENCE: 34	STS-36	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> Data not available DOD Classified Mission	
<u>DEPLOYABLE PAYLOADS:</u> Data not available, DOD Classified Mission			<u>CREW COMPARTMENT PAYLOAD:</u> Data not available, DOD Classified Mission	
<u>ATTACHED PLB PAYLOADS:</u> Data not available, DOD Classified Mission			<u>SPECIAL PAYLOAD MISSION KITS:</u> Data not available, DOD Classified Mission	

CARGO SUMMARY		MISSION SEQUENCE: 35	STS-31	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
25,517	23,905	1,612		
<u>DEPLOYABLE PAYLOADS:</u> Hubble Space Telescope (HST), a large aperture optical telescope. Total deployed wt = 23,905 lb			<u>CREW COMPARTMENT PAYLOAD</u> 1. Air Force Maui Optical Site Calibration Test (AMOS) 2. IMAX Camera 3. Investigation into Polymer Membrane Processing (IPMP) 4. Protein Crystal Growth (PCG) 5. Radiation Monitoring Experiment (RME) 6. Investigation of Arc and Ion Behavior in Microgravity (Student Experiment 82-16)	
<u>ATTACHED PLB PAYLOADS:</u> 1. IMAX Cargo Bay Camera (ICBC) 2. Ascent Particle Monitor (APM)			<u>SPECIAL PAYLOAD MISSION KITS</u> 1. RMS 301 2. Galley 3. HST EVA Tools	

CARGO SUMMARY		MISSION SEQUENCE: 36	STS-41	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
46,173	38,604	7,569		
<u>DEPLOYABLE PAYLOADS:</u> Ulysses/IUS/PAM-S - Deployable weight = 38,604 lb			<u>CREW COMPARTMENT PAYLOAD:</u> CHROMEX - Chromosome and Plant Cell Division in Space Environment SSCE - Solid Surface Combustion Experiment VCS - Voice Command System Experiment PSE - Physiological Systems Experiment RME - Radiation Monitoring Experiment IPMP - Investigation into Polymer Membrane Processing AMOS - Air Force Maui Optical Site Calibration Test	
<u>ATTACHED PLB PAYLOADS</u> SSBUV - Shuttle Solar Backscatter Ultraviolet Spectrometer ISAC - Intelsat Solar Array Coupon (Attached to RMS arm)			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. RMS 301 2. Galley 3. Radioisotope Generator (RTG) Cooling System	

CARGO SUMMARY		MISSION SEQUENCE: 37	STS-38	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> Data not available - DOD Classified Mission	
<u>DEPLOYABLE PAYLOADS:</u> Data not available - DOD Classified Mission			<u>CREW COMPARTMENT PAYLOAD</u> Data not available - DOD Classified Mission	
<u>ATTACHED PLB PAYLOADS</u> Spacelab 2 Data not available - DOD Classified Mission			<u>SPECIAL PAYLOAD MISSION KITS:</u> Data not available - DOD Classified Mission	

CARGO SUMMARY		MISSION SEQUENCE: 38		STS-35	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None		
27,760	0	27,760			
<u>DEPLOYABLE PAYLOADS:</u> None			<u>CREW COMPARTMENT PAYLOAD:</u> SAREX - Shuttle Amateur Radio Experiment AMOS - Air Force Maui Optical Site Calibration Test		
<u>ATTACHED PLB PAYLOADS:</u> ASTRO-1 - Three ultraviolet telescopes attached to an Instrument Pointing System (IPS): 1. Wisconsin UV Photopolarimeter Experiment (WUPPE) 2. UV Imaging Telescope (UIT) 3. Hopkins UV Telescope (HUT) BBXRT - Broad Band X-Ray Telescope Attached to its own two-axis pointing system (TAPS)			<u>SPECIAL PAYLOAD MISSION KITS:</u> 1. Galley 2. Aerodynamic Coefficient Identification Package (ACIP)		

CARGO SUMMARY		MISSION SEQUENCE: 39		STS-37	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None		
36,800	34,442	2,358			
<u>DEPLOYABLE PAYLOADS:</u> Gamma Ray Observatory (GRO), an unmanned observatory designed to image objects at high (gamma ray) wavelengths. Deployment weight: 34,442 lb			<u>CREW COMPARTMENT PAYLOAD:</u> Protein Crystal Growth (PCG) - II Air Force Maui Optical Site (AMOS) Radiation Monitoring Equipment (RME) - III Shuttle Amateur Radio Experiment (SAREX-II) Bioserve/Instrumentation Technology Associates Materials Dispersion Apparatus (BIMDA)		
<u>ATTACHED PLB PAYLOADS:</u> Crew and Equipment Translation Aids (CETA) - designed to evaluate candidate techniques/equipment for EVA crewmember translation. Ascent Particle Monitor (APM) - designed to assess the the particulate contamination in the Orbiter PLB during ascent			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS - S/N 303		

CARGO SUMMARY		MISSION SEQUENCE: 40	STS-39	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special)</u> None	
21,413	4,873	20,495	<u>CREW COMPARTMENT PAYLOAD:</u> Cloud Logic to Optimize Use of Defense Systems (CLOUDS) - 1A Radiation Monitoring Equipment (RME) - III	
<u>DEPLOYABLE PAYLOADS:</u> Shuttle Payload Autonomous Satellite (SPAS) - II/ Infrared Background Signature Survey (IBSS) - SPAS-II/ IBSS was designed to observe rocket plume firings at infrared wavelengths Deployment weight: 4,046 lb Retrieval weight: 3,955 lb <u>Multi-Purpose Experiment Container (MPEG)</u> An additional USAF experiment mounted on STP-1 Deployed weight: 270 lb <u>CRO A, B, and C canister</u> Three canisters of chemicals were released. Deployed weight: 548 lb			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS - S/N 301	
<u>ATTACHED PLB PAYLOAD:</u> <u>Air Force Program (AFP) - 675</u> The objective of AFP-675 was to observe near-Earth space and celestial objects at infrared and ultraviolet wavelengths. <u>Space Test Payload (STP) - 1</u> Five USAF experiments mounted on a Hitchhiker M carrier.				

CARGO SUMMARY		MISSION SEQUENCE: 41	STS-40	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> 12 Experiments on GBA Solid State MicroaccelerometerExperiment Experiment in Crystal Growth Orbital Ball Bearing Experiment In-Space Commercial Processing Foamed Ultralight Metals Chemical Precipitate Formation Microgravity Experiments Flower and vegetable seeds exposure to Space Semiconductor Crystal Growth Experiment Active Soldering Experiments Orbiter Stability Experiment Effects of Cosmic Ray Radiation on Floppy Disks and Plan Seeds Exposure to Microgravity	
28,114	0	28,114	<u>CREW COMPARTMENT PAYLOAD:</u> Physiological Monitoring System (PMS) Urine Monitoring System (UMS) Animal Enclosure Modules (AEM) Middeck Zero-Gravity Experiment (MODE)	
<u>DEPLOYABLE PAYLOADS:</u> None			<u>SPECIAL PAYLOAD MISSION KITS:</u> Airlock Transfer Tunnel Note RMS NOT FLOWN	
<u>ATTACHED PLB PAYLOADS:</u> <u>Spacelab Life Sciences (SLS) - 1</u> a.. Spacelab Long Module b. Tunnel c. Tunnel Extension d. Tunnel Adapter <u>Experiments</u> 6 Body Systems 6 Cardiovascular/Cardiopulmonary 3 Blood System 6 Musculoskeletal 3 Neurovestibular 1 Immune System 1 Renal/Endocrine System <u>Gas Bridge Assembly (GBA) - 12</u> GAS experiments mounted on a truss structure PLB				

CARGO SUMMARY		MISSION SEQUENCE: 42		STS-43	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special) (continued)</u> 1. Tank Pressure Control Experiment (TPCE)		
46,712	37,575	9,137	<u>CREW COMPARTMENT PAYLOAD:</u> 1. Air Force Maui Optical Site Calibration Test (AMOS) 2. Auroral Photography Experiment (APE) 3. Bioserve/Instrumentation Technology Associates Materials Dispersion Apparatus (BIMDA) 4. Investigations into Polymer Membrane Processing (IPMP) 5. Protein Crystal Growth (PCG-III) 6. Space Acceleration Measurement System (SAMS) 7. Solid Surface Combustion System (SSCS) 8. Ultraviolet Plume Instrument		
<u>DEPLOYABLE PAYLOADS:</u> Tracking and Data Relay Satellite/Inertial Upper Stage (TDRS/IUS), one of four identical communication satellites providing support for STS and other customer TDRS/IUS Weight = 37,575 lb			<u>SPECIAL PAYLOAD MISSION KITS:</u> None		
<u>ATTACHED PLB PAYLOADS:</u> 1. Space Station Heatpipe Advanced Radiator Element (SHARE-II) 2. Shuttle Solar Backscatter Ultraviolet Instrument 03 (SSBUV) 3. Optical Communications Through the Window (OCTW) <u>Gas Bridge Assembly (GBA)</u>					

CARGO SUMMARY		MISSION SEQUENCE: 43		STS-48	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None		
17,144	14,388	2,756	<u>CREW COMPARTMENT PAYLOAD:</u> 1. Ascent Particle Monitor (APM) 2. Cosmic Radiation Effects and Activation Monitor (CREAM) 3. Radiation Monitoring Experiment (RME) 4. Investigations into Polymer Membrane Processing (IPMP) 5. Protein Crystal Growth (PCG) 6. Middeck 0-Gravity Dynamics Experiment (MODE) 7. Shuttle Activation Monitor (SAM) 8. Physiological and Anatomical Rodent Experiment (PARE)		
<u>DEPLOYABLE PAYLOADS:</u> Upper Atmosphere Research Satellite (UARS) UARS Weight = 17,144 lb Deployable weight: 14,388 lb Non-deployable weight: 2,050 lb			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS 301		
<u>ATTACHED PLB PAYLOAD:</u> <u>Gas Bridge Assembly (GBA)</u>					

CARGO SUMMARY		MISSION SEQUENCE: 44	STS-44	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
44,637	37,588	7,049	<u>CREW COMPARTMENT PAYLOADS</u> 1. Terra Scout 2. Military Man in Space (M88-1) 3. Air Force Maui Optical Site Calibration Test (AMOS) 4. Cosmic Radiation Effects and Activation Monitor (CREAM) 5. Shuttle Activation Monitor (SAM) 6. Radiation Monitoring Equipment (RME-III) 7. Visual Function Monitor (VFT-1) 8. Ultraviolet Plume Instrument (UVPI)	
<u>DEPLOYABLE PAYLOADS:</u> Defense Support Program/Inertial Upper Stage satellite DSP/IUS Weight Deployed weight: 37,588 lb Non-deployed weight: 5,612 lb			<u>SPECIAL PAYLOAD MISSION KITS:</u> None	
<u>ATTACHED PLB PAYLOADS:</u> Interim Operational Contamination Monitor (IOCM) Gas Bridge Assembly (GBA)				

CARGO SUMMARY		MISSION SEQUENCE: 45	STS-42	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special): (GAS) BRIDGE CONSISTING OF 12 CANNISTERS</u>	
28,663	0	28,663	G-086: Effects of microgravity on cysts hatched in space; thermal conductivity and bubble velocity of air in water G-140: Marangoni convection in a floating zone G-143: Glass bubbles in glass melts G-329: Solidification of phenomena in metal alloys G-336: Measurement of diffuse zodiacal and galactic emissions at B, R, & V standard astronomical wavelengths G-337: Performance of thermoacoustic refrigerator under microgravity G457: Gas-liquid separation under microgravity G609, G610: Ultraviolet observations of deep space G-614: Motion of debris under microgravity conditions: low melting point materials processing GAS ballast payload no. 1 (GBP 1) GAS ballast payload no. 2 (GBP 2)	
<u>DEPLOYABLE PAYLOADS:</u> None			<u>CREW COMPARTMENT PAYLOAD</u> Gelation of Sols: Applied Microgravity Research (GOSMAR) Student Experiment SE 83-2 Investigation into Polymer Membrane Processing (IPMP) Radiation Monitoring Equipment (RME-III)	
<u>ATTACHED PLB PAYLOADS:</u> International Microgravity Laboratory-1 (Spacelab Long Module) Objective: Conduct 9 Materials Science and 7 Life Science Experiments in Microgravity 1. Fluid Experiment System - Crystal growth and fluid behavior 2. Vapor Crystal Growth System - Reflight from Spacelab 3 3. Mercury Iodide Crystal Growth - Reflight from Spacelab 3 4. Protein Crystal Growth Reflight from STS-26, 29, 32, 37 (Middeck) 5. Organic Crystal Growth Facility - Crystal growth 6. Cryostat - Crystal Growth 7. Space Acceleration Monitoring System - Measure on-orbit shuttle acceleration to support other microgravity experiments 8. Critical Point Facility - Measure material properties at the critical point 9. Gravitational Plant Physiology Facility- Biological Investigation of plants during spaceflight 10. Biorack - Biological investigation of various life forms during spaceflight - Reflight of Spacelab D-1 experiment 11. Space Physiology experiments - Investigate human space adaption and motion sickness 12. Microgravity Vestibular Investigations - Study space motion sickness 13. Biostack - Investigate space radiation effects on biological materials 14. Mental Workload and Performance Evaluation - Test human performance of computer tasks in Zero-G 15. Radiation Monitoring Container/Dosimeter Measure effect of space radiation on biological materials			<u>SPECIAL PAYLOAD MISSION KITS:</u> None	

CARGO SUMMARY		MISSION SEQUENCE: 46		STS-45	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB		Space Plasma Physics Atmospheric Emissions Photometric Imaging (AEPI) Previously flown on Spacelab 1 Space Experiments with Particle Accelerators (SEPAC) Previously flown on Spacelab 1 Energetic Neutral; Atom Precipitation Ultraviolet Astronomy - Far Ultraviolet Space Telescope (FAUST), previously flown on Spacelab 1 Shuttle Solar Backscatter Ultraviolet/A (SSBUV/A) Objective: To provide more accurate and reliable readings of global ozone to aid in the calibration of backscatter ultraviolet instruments being flown on free-flying satellites	
17,683	0	17,683			
<u>DEPLOYABLE PAYLOADS:</u>					
None					
<u>GAS (Getaway Special):</u>					
Getaway Special 229 (GAS-229) Objective: To melt and regrow gallium arsenide crystals with convective effects absent.					
<u>ATTACHED PLB PAYLOADS:</u>				<u>CREW COMPARTMENT PAYLOAD:</u>	
ATLAS-1 (2 Spacelab Pallet and Igloo) Objective: Study the composition of the middle atmosphere and its variations over an 11 year solar cycle. This is the first of 10 planned ATLAS missions over the next 11 years. Atmosphere Physics Atmosphere Trace Molecule Spectroscopy (ATMOS) previously flew on Spacelab 1, Reflight from Spacelab 3 Millimeter Wave Atmospheric Sounder (MAS), first flight Atmospheric Lyman Alpha Emissions (ALAE), previously flew on Spacelab 1 Grille Spectrometer (GRILLE), previously flew on Spacelab 1 Imaging Spectrometric Observatory (ISO), previously flew on Spacelab 1 Solar Science Active Cavity Radiometer Irradiance Monitor (ACRIM) ACRIM 1 flown on the solar maximum satellite Measurement of the Solar Constant (SOLCON) Previously flown on Spacelab 1 Solar Spectrum Measurement from 180 to 3200 Nanometers (SOLSPEC) Previously flown on Spacelab 1 Solar Ultraviolet Spectral Irradiance Monitor (SUSIM) Previously flown on Spacelab 2 and on the Upper Atmosphere Research Satellite (UARS)				Investigation into Polymer Membranes Processing (IPMP) Objective: to flash evaporate mixed solvent systems in the absence of convection to control the porosity of the polymer membrane in microgravity Space tissue LOSS-01 (STL-01) Objective: To monitor the activities of tissue samples at the cellular level under the influence of microgravity Radiation Monitoring Equipment-III (RME-III) Objective: To measure ionizing radiation over repeated time intervals and digitally store the resulting data Visual Function Tester-2 (VFT-2) Objective: To measure basic vision performance parameters in an orbital space flight environment Cloud Logic to Optimize Use of Defense System Objective: To obtain photographic sequences of cloud fields of interest as targets of opportunity. Shuttle Amateur Radio Experiment II (SAREX II) Objective: To demonstrate voice, slow-scan television (SSTV), and pocket radio. All transmitted on 2 meter capabilities and fast scan television (FSTV) transmitted on 70 cm capability.	
<u>SPECIAL PAYLOAD MISSION KITS:</u>					
None					

CARGO SUMMARY		MISSION SEQUENCE: 47	STS-49	ORBITER OV-105
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
32,809	23,346	9,463		
<u>DEPLOYABLE PAYLOADS:</u> International telecommunications satellite VI F3 (Intelsat) perigee kick motor (PK)			<u>CREW COMPARTMENT PAYLOAD:</u> Commercial protein crystal growth (CPCG) Air Force Maui Optical Site Calibration (AMOS) Ultraviolet Plume Instrument (UVPI)	
<u>ATTACHED PLB PAYLOADS:</u> Assembly of station by EVA methods			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS 303	

CARGO SUMMARY		MISSION SEQUENCE: 48	STS-50	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
24,305	0	24,305		
<u>DEPLOYABLE PAYLOADS:</u> None			<u>CREW COMPARTMENT PAYLOAD</u> Zeolite Crystal Growth *Generic Bioprocessing Apparatus with 1 Refrigerator/ Incubator Module (R/IM) *Astroculture (ASC) Protein Crystal Growth (PCG) Block 1 with 3 R/IMs *Investigation into Polymer Membrane Processing (IPMP) Shuttle Amateur Radio Experiment - II (SAREX-II) Ultraviolet Plume Instrument (UVPI)	
<u>ATTACHED PLB PAYLOADS:</u> United States Microgravity Laboratory (USML-1) Investigation into Polymer Membrane Processing (IPMP) Shuttle Amateur Radio Experiment - II (SAREX-II) Ultraviolet Plume Instrument (UVPI) Orbital Acceleration Research Experiment (OARE) Zeolite Crystal Growth (ZCG) Astroculture Generic Bioprocessing Apparatus (GBA) Protein Crystal Growth (PCG) Block 1			<u>SPECIAL PAYLOAD MISSION KITS:</u> None	

CARGO SUMMARY		MISSION SEQUENCE: 49	STS-46	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
28,585	11,387	18,594		
<u>DEPLOYABLE PAYLOADS:</u> EURECA Deployable weight: 9,901 lb			<u>CREW COMPARTMENT PAYLOAD:</u> Gas Autonomous Payload Controller (GAPC) for Use in ICBC Operations Pituitary Growth Hormone Cell Function (PHCF) Air Force Maui Optical Site Calibration (AMOS) (Passive Requirements Only) Ultraviolet Plume Instrument (UVPI)	
<u>ATTACHED PLB PAYLOADS:</u> Tethered Satellite System (TSS-1) Evaluation of Oxygen Interaction with Materials-III/Thermal Energy Management Processes 2A-3 (EOIM-III/Temp 2A) IMAX Cargo Bay Camera (ICBC) Consortium for Material Development in Space - Autonomous Payload-II (CONCAP-II) CONCAP-III - Limited Duration Space Environment Candidate Materials Exposure (LDCE)			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS S/N 201	

CARGO SUMMARY		MISSION SEQUENCE: 50	STS-47	ORBITER OV-105
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
27,607	0	27,607		
<u>DEPLOYABLE PAYLOADS:</u> None			<u>CREW COMPARTMENT PAYLOAD:</u> Israeli Space Agency Investigation about Hornets (ISIAH) Shuttle Amateur Radio Experiment (SAREX) Solid Surface Combustion Experiment (SSCE) Ultraviolet Plume Instrument (UVPI) - Payload of Opportunity	
<u>ATTACHED PLB PAYLOADS:</u> Japanese Spacelab (Spacelab-J) Long Module Gas Bridge Assembly (GBA) with 12 gas canisters			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS 303	

CARGO SUMMARY		MISSION SEQUENCE: 51	STS-52	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
20,132	5,577	14,555		
<u>DEPLOYABLE PAYLOADS:</u> Laser Geodynamics Satellite (LAGEOS)			<u>CREW COMPARTMENT PAYLOAD:</u> Queens University Experiment in Liquid Metal Diffusion (QUELD) Phase Partition in Liquid (PARLIQ) Sun Photo Spectrometer Earth Atmosphere Measurement- (SPEAM) Orbiter Glow-2 Space Adaptation Tests and Observation(SATO) Commercial Materials Dispersion Apparatus Instrumentation Technology Associates Experiments (CMIX) Crystal by Vapor Transport Experiment(CVTE) Heat Pipe Performance (HPP) Commercial Protein Crystal Growth (CPCG) Shuttle Plume Impingement Experiment (SPIE) Physiological System Experiment (PSE)	
<u>ATTACHED PLB PAYLOADS:</u> United States Microgravity Payload-2 (USMP-1)			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS 301	

CARGO SUMMARY		MISSION SEQUENCE: 52		STS-53	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None		
26,118	20,953	7,557	<u>CREW COMPARTMENT PAYLOAD</u>		
<u>DEPLOYABLE PAYLOADS:</u> DOD-1 Payload Deployment Weight: 20,953 lb			CLOUDS - Cloud Logic to Optimize the use of Defense Systems FARE - Fluid Acquisition and Resupply Experiment MIS - Microcapsule In Space RME III - Radiation Monitoring Equipment - III STL - Space Tissue Loss BLAST - Battlefield Laser Acquisition Sensor Test HERCULES - Hand-Held, Earth-Oriented, Real-Time, Cooperative, User Friendly, Location Targeting, and Environmental System CREAM - Cosmic Radiation Effects and Activation Monitor		
<u>ATTACHED PLB PAYLOADS:</u> ODERACS - Orbital Debris Radar Calibration Spheres GLO - Glow Experiment/Cryogenic Heat Pipe Experiment			<u>SPECIAL PAYLOAD MISSION KITS</u> Note: RMS NOT FLOWN		

CARGO SUMMARY		MISSION SEQUENCE: 53		STS-54	ORBITER OV-105
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None		
46,540	37,497	11,572	<u>CREW COMPARTMENT PAYLOAD:</u> CHROMEX - Chromosome and Plant Cell Division in Space CGBA - Commercial Generic Bioprocessing Apparatus PARE - Physiological and Anatomical Rodent Experiment SSCE - Solid Surface Combustion Experiment		
<u>DEPLOYABLE PAYLOADS:</u> TDRS/IUS - Tracking and Data Relay Satellite/Inertial Upper Stage Deployment Weight = 37,497 lb.					
<u>ATTACHED PLB PAYLOADS - Spacelab 3:</u> DXS - Diffuse X-Ray Spectrometer			<u>SPECIAL PAYLOAD MISSION KITS:</u> None		

CARGO SUMMARY		MISSION SEQUENCE: 54		STS-56	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None		
16,439	2,840	20,988	<u>CREW COMPARTMENT PAYLOAD:</u> SUVE - Solar Ultraviolet Spectrometer HERCULES - Hand-Held, Earth-Oriented, Real-Time, Cooperative, User-Friendly, Location Targeting, and Environmental System RME III - Radiation Monitoring Equipment III CREAM - Cosmic Radiation Effects and Activation Monitor SAREX II - Shuttle Amateur Radio Experiment II CMIX - Commercial Materials Dispersion Apparatus ITA Experiments STL - Space Tissue Loss Experiment PARE - Physiological and Anatomical Rodent Experiment		
<u>DEPLOYABLE PAYLOADS:</u> SPARTAN-201 - Shuttle Pointed Autonomous Research Tool for Astronomy-201 Deployed Weight: 2,840 lb Retrieved Weight: 2,798 lb			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS - S/N 201		
<u>ATTACHED PLB PAYLOADS:</u> ATLAS-2 - Atmospheric Laboratory for Applications and Science					

CARGO SUMMARY		MISSION SEQUENCE: 55	STS-55	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> RKGM - Reaction Kinetics in Glass Melts	
26,881	0	33,721		
<u>DEPLOYABLE PAYLOADS:</u> None			<u>CREW COMPARTMENT PAYLOAD</u> Crew Telesupport Experiment SAREX - Shuttle Amateur Radio Experiment	
<u>ATTACHED PLB PAYLOADS:</u> SPACELAB - D2 (German) payload User Support Structure MAUS - Material Science Autonomous Payload AOET - Atomic Oxygen Exposure Tray GAUSS - Galactic Ultrawide Angle Schmidt System Camera MOMS - Modular Opto-Electronic Multispectral Stereo Scanner			<u>SPECIAL PAYLOAD MISSION KITS:</u> Note: RMS NOT FLOWN	

CARGO SUMMARY		MISSION SEQUENCE: 56	STS-57	ORBITER OV-105
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> G-022 - Liquid Gauging Technology Experiment G-324 - Can Do G-399 - Insulin Tagging & Artemia Growth Experiment G-450 - Multiple Experiments G-452 - Crystal Growth Gallium Arsenide G-453 - Semi-Conductor/Super Conductor Experiment G-454 - Crystal Growth G-535 - The Pool Boiling Experiment G-601 - High Frequency Variations of the Sun G-647 - Configurable Hardware for Multi- Disciplinary Projects in Space	
19,630	132	29,149		
<u>DEPLOYABLE PAYLOADS:</u> EURECA - European Retrievable Carrier Retrieval Weight = 9424 lb			<u>CREW COMPARTMENT PAYLOAD:</u> Fluid Acquisition & Resupply Experiment Shuttle Amateur Radio Experiment Air Force Maui Optical Calibration Site Calibration Test	
<u>ATTACHED PLB PAYLOADS:</u> SPACEHAB-1 Bioserve Pilot Laboratory Liquid Encapsulated Melt Zone ECLSS Flight Experiment Human Factors Assessment Physiological Systems Experiment Space Acceleration Measurement System Superfluid Helium On Orbit Transfer Consortium for Materials Development in Space Complex Autonomous Payload-IV			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS	

CARGO SUMMARY		MISSION SEQUENCE: 57	STS-51	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
42,637	34,210	19,826	<u>CREW COMPARTMENT PAYLOAD:</u> IMAX - In-Cabin Operations	
<u>DEPLOYABLE PAYLOADS:</u> ACTS/TOS - Advanced Communications Technology Satellite/ Transfer Orbit Stage Deployment Wt. = 26,889 lb ORFEUS/SPAS - Orbiting Retrievable Far and Extreme Ultraviolet Spectrometer Shuttle Satellite Deployment Wt. = 7321 lb Retrieval Wt. = 7321 lb			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS Special EVA Tools	
<u>ATTACHED PLB PAYLOADS:</u> LDCE - Limited Duration Space Environment Candidate Materials Exposure CHROMEX - Chromosome & Plant Cell Division in Space CPCG - Commercial Protein Crystal Growth HRSGS - High Resolution Shuttle Glow Spectroscopy APE-B - Auroral Photography Experiment-B PMP - Investigation into Polymer Membrane Processing RME-III - Radiation Monitoring Experiment AMOS - Air Force Maui Optical Site Calibration Test RIMC - Remote IMAX Camera				

CARGO SUMMARY		MISSION SEQUENCE: 58	STS-58	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special)</u> None	
23,127	0	32,041	<u>CREW COMPARTMENT PAYLOAD:</u> Orbital Acceleration Research Experiment Shuttle Amateur Radio Experiment Urine Monitoring System	
<u>DEPLOYABLE PAYLOADS:</u> None			<u>SPECIAL PAYLOAD MISSION KITS:</u> None	
<u>ATTACHED PLB PAYLOAD:</u> SPACELAB LIFE SCIENCES-2 <u>Cardiovascular/Cardiopulmonary System Experiments</u> 066 - In-Flight Study of Cardiovascular Deconditioning 294 - Cardiovascular Adaptation to Zero Gravity 198 - Pulmonary Function During Weightlessness <u>Neurovascular System</u> 238 - Effects of Space Travel on Mammalian Gravity Receptors 072 - Vestibular Experiments in Spacelab <u>Regulatory Physiology</u> 192 - Fluid-Electrolyte Regulation During Space Flight 141 - Regulation of Blood Volume During Space Flight 012 - Regulation of erythropoiesis in Rats During Space Flight 261 - Influence of Space Flight on Elythrokinetics in Man Masculo Skeletal System 120 - Protein Metabolism During Space Flight 127 - Effect of Zero Gravity on the Functional & Biochemical Properties of Anti-Gravity Skeletal Muscles 303 - Effects of Microgravity on the Electron Microscopy Histrochemistry & Protease Activity of Rat Hindlimb Muscles 305 - Pathophysiology of Mineral Loss During Space Flight 194 - Bone, Calcium & Space Flight				

CARGO SUMMARY		MISSION SEQUENCE: 59	STS-61	ORBITER OV-105
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> None	
17,401	2,308	24,543		
<u>DEPLOYABLE PAYLOADS:</u> Hubble Space Telescope Replacement Equipment Retrieved Wt. = 1,814.0 lb (deployed solar array not included)			<u>CREW COMPARTMENT PAYLOAD:</u> IMAX Camera	
<u>ATTACHED PLB PAYLOADS:</u> HST Solar Arrays HST Wide Field/Planetary Camera II HST Corrective Optics Space Telescope Axial Replacement(COSTAR) HST Rate Sensing Units HST Electronic Control Units HST Magnetic Sensing Systems IMAX Cargo Bay Camera			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS HST EVA Tools & Crew Aids	

CARGO SUMMARY		MISSION SEQUENCE: 60	STS-60	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special)</u> G-071 - Ball Bearing Experiment G-514 - Orbiter Stability Experiment & Medicines in Microgravity G-536 - Heat Flux G-577 - Capillary Pumped Loop Experiment	
22,311	3,956	28,831		
<u>DEPLOYABLE PAYLOADS:</u> Wake Shield Facility Deployment Wt. = 3,785 lb (Not deployed) Retrieval Wt. = 3,785 lb Bremen Satellite Deployment Wt. = 139 lb ODERACS Deployment Wt. = 32 lb			<u>CREW COMPARTMENT PAYLOAD:</u> SAREX - Shuttle Amateur Radio Experiment APE-B - Auroral Photography Experiment	
<u>ATTACHED PLB PAYLOADS:</u> SPACEHAB-2 PAYLOAD Astroculture-3 Bioserve Pilot Laboratory Commercial Generic Bioprocessing Apparatus Equipment for Controlled Liquid Phase Sintering Experiment Immunology Experiment-01 Organic Separation Pennsylvania State Biomodule Space Acceleration Measurement System Space Experiment Facility Stirling Orbiter Refrigerator/Freezer Sample Return Experiment Three-dimensional Microgravity Accelerator ODERACS - Orbital Debris Radar Calibration Spheres BREMSAT - Bremen Satellite Experiment			<u>SPECIAL PAYLOAD MISSION KITS:</u> None	

CARGO SUMMARY		MISSION SEQUENCE: 61		STS-62	ORBITER OV-102
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB		GAS (Getaway Special): None	
19,792	0	30,046		CREW COMPARTMENT PAYLOAD:	
<u>DEPLOYABLE PAYLOADS:</u> None				Advanced Protein Crystal Growth Experiments Commercial Protein Crystal Growth Payload Middeck 0-Gravity Dynamics Experiment Air Force Maui Optical Calibration Test Auroral Photography Experiment-B Bioreactor Demonstration System Physiological Systems Experiment	
<u>ATTACHED PLB PAYLOAD:</u> United States Microgravity Payload-2 - Advanced Automated Directional Solidification Furnace - Material pour L-Etude des Phenomenes Interessant la Solidification sur Tere et an Orbite - Isothermal Dendritic Growth Experiment - Critical Fluid Light Scattering Experiment - Space Acceleration Measurement System Office of Aeronautics & Space Technology - Experimental Investigation of Spacecraft Glow - Spacecraft Kinetic Infrared Test Experiment - Cryogenic Two-Phase Experiment - Solar Array Module Plasma Interaction Experiment - Thermal Energy Stowage Experiment - Emulsion Chamber Technology Experiment Shuttle Solar Backscatter Ultraviolet A Experiment Dexterous End Effector Limited Duration Space Environment Candidate Materials Exposure Experiment				<u>SPECIAL PAYLOAD MISSION KITS:</u> None	

CARGO SUMMARY		MISSION SEQUENCE: 62		STS-59	ORBITER OV-105
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (Getaway Special):</u> G-203 - Study of Freezing & Crystallization G-300 - Thermal Conductivity Measurements on Liquids in Microgravity G-458 - Growth of Small Fruiting Bodiies in Microgravity		
27,447	0	33,788			
<u>DEPLOYABLE PAYLOADS:</u> None			<u>CREW COMPARTMENT PAYLOADS</u> Space Tissue Loss Shuttle Amateur Raio Experiment II Toughened Uni-Piece Fibrous Insulation Visual Function Tester-4		
<u>ATTACHED PLB PAYLOADS:</u> Space Radar Laboratory - 1 Consortium for Materials Developemnt in Space Complex Autonomous Payload-IV Measurement of Air Pollution from Satellite			<u>SPECIAL PAYLOAD MISSION KITS:</u> None		

CARGO SUMMARY		MISSION SEQUENCE: 63		STS-65	ORBITER OV-102
PAYLOAD-CHARGEABLE	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	2. Materials Science: a. Advance ProteinCrystallization Facility b. Bubble, Drop, and Particle Unit c. Critical Point Facility d. Free Flow Electrophoresis Unit e. Large Isothermal Furnace f. Quasi - Steady Acceleration Measurement g. Space Acceleration Measurement System h. Electromagnetic Containerless Processing Facility i. Vibration Isolation Box Experiment Station Orbital Acceleration Research Experiment Inter-Mars Tissue Equivalent Proportional Counter (ITEPC)		
CARGO WEIGHT AT LIFT-OFF, LB					
24,159	0	24,159			
<u>DEPLOYABLE PAYLOADS:</u>					
None					
<u>ATTACHED PLB PAYLOADS:</u> International Microgravity Laboratory-2 (Spacelab) 1. Life Sciences a. Aquatic Animal Experiment Unit b. Biorack c. Biostack d. Extended Duration Orbiter (EDO) Medical Project e. Linear Compressor Enhanced Orbiter Refrigerator/Freezer f. Slow Rotating Centrifuge Microscope g. Microgravity Effects on Standardized Cognitive Performance Measures h. Applied Research of Separation Methods Using Space Electrophoresis i. Real-Time Radiation Monitoring Device j. Spinal Injuries in Microgravity k. Thermoelectric Incubator and Cell Culture Kits					
			<u>GAS (Getaway Special):</u>		
			None		
			<u>CREW COMPARTMENT PAYLOADS</u>		
			Commercial Protein Crystal Growth Shuttle Amateur Radio Experiment Military Applications of Ship Tracks Air Force Maui Optical System		
			<u>SPECIAL PAYLOAD MISSION KITS:</u>		
			None		

CARGO SUMMARY		MISSION SEQUENCE: 64		STS-64	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GETAWAY SPECIALS:</u> G-178 - Ozone Measurements of Earth's Upper Atmosphere in the Ultraviolet 200 to 400 Nanometer Spectral Range G-254 - Four Experiments: a. Distillation Experiment b. Float Zone Instability Experiment c. Pachamama d. Bubble Interferometer Experiment G-325 - Sound Effects on Dust Particles in Near Zero Gravity G-417 - Three Experiments: a. Reproduction of Parameciums b. Surface Interaction of Different Fluids c. Survey of Surface Interaction of Solids and Liquids G-453 - Two Experiments: a. Formation of Silicon-Lead Alloy b. Boiling of Organic Solvent under Microgravity and in the Absence of Convection G-454 - Two Experiments: a. Crystal Growth of 3-Selenic Niobium from the Vapor Phase b. Crystal Growth of the Optoelectronic Crystal by the Diffusion Method. G-456 - Electrophoresis Experiment. G-485 - Feasibility of Depositing Different Materials in a Vacuum Environment in Microgravity G-506 - Orbiter Stability Experiment G-562 - Quest-2 Material Sciences Experiment a. Droplet Growth in Liquid-Liquid Systems b. Metal-Matrix Composites c. Distribution of Reinforcing Material Produced in Microgravity and One-Gravity <u>SPECIAL PAYLOAD MISSION KITS:</u> RMS 201 - Not used		
19,260	2,840	19,218			
<u>DEPLOYABLE PAYLOADS:</u> Shuttle Pointed Autonomous Research Tool For Astronomy - 201 (SPARTAN) Deployable Weight: 2840 lb Retrieval Weight: 2798 lb					
<u>ATTACHED PLB PAYLOADS:</u> Robot Operated Materials Processing System (ROMPS) LIDAR In-Space Technology Experiment (LITE) Shuttle Plume Impingement Flight Experiment Simplified Aid for EVA Rescue Trajectory Control Sensor					
<u>CREW COMPARTMENT PAYLOADS:</u> Air Force Maui Optical Site Military Applications of Ship Tracks Solid Surface Combustion Experiment Radiation Monitoring Experiment III Shuttle Amateur Radio Experiment Biological Research in Canisters					

CARGO SUMMARY		MISSION SEQUENCE: 65		STS-68	ORBITER OV-105
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>GAS (GETAWAY SPECIALS):</u> G-316 - Two Experiments: 1. Effects of Microgravity on Survival, Mating and Development of Milkweed Bug. 2. Microgravity Effects on Growth Quality and Size of Crystal of Rochelle Salt. G-503 - Four Experiments: 1. Microgravity and Cosmic Radiation Effects on Diatoms 2. Concrete Curing in Microgravity 3. Root Growth in Space 4. Microgravity Corrosion G-541 - Study of Breakdown of Planar Solid/Liquid Interface during Crystal Growth		
27,582	0	27,582			
<u>DEPLOYABLE PAYLOADS:</u> None					
<u>ATTACHED PLB PAYLOADS:</u> Space Radar Laboratory-2			<u>SPECIAL PAYLOAD MISSION KITS</u> RMS - 303		
<u>CREW COMPARTMENT PAYLOADS:</u> Chromosome and Plant Cell Division in Space Commercial Protein Crystal Growth Biological Research in Canisters Cosmic Radiation Effects and Activation Monitor Military Applications of Ship Tracks					

CARGO SUMMARY		MISSION SEQUENCE: 66	STS-66	ORBITER OV-104
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>ATTACHED PLB PAYLOADS (CONT'D)</u> Inter Mars Tissue Equivalent Proportional Counter Experiment of the Sun complementing the Atlas Payload and Education - II	
18,001	7194	18,001		
<u>DEPLOYABLE PAYLOADS:</u> CRISTA - SPAs Deployed Wt. 7194 lb Retrieval Wt. 7194 lb			<u>GAS (GETAWAY SPECIALS):</u> None	
<u>ATTACHED PLB PAYLOADS:</u> ATLAS - 3 (SPACELAB) a. Chemical Constituents of the Middle Atmosphere 1. Atmospheric Trace Molecule Spectroscopy 2. Millimeter Wave Atmospheric Sounder 3. Shuttle Solar Backscatter Ultraviolet/A b. Solar Radiation and the Middle Atmosphere 1. Solar Spectrum Experiment 2. Solar Ultraviolet Spectral Radiation Monitor TOTAL SOLAR IRRADIANCE MEASUREMENTS 1. Active Cavity Radiometer Irradiance Monitor 2. Solar Constant PAYLOAD MISSION-PECULIAR/MISSION DEPENDENT EQUIPMENT - Global Positioning System			<u>CREW COMPARTMENT PAYLOADS:</u> Physiological and Anatomical Rodent Experiment/National Institutes of Health - Rodents (PARE - NIH-R) Protein Crystal Growth Experiments Space Tissue Loss/National Institutes of Health - Cells (STL-NIH-C) Space Acceleration Measurement System Heat Pipe Performance Experiment	
			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS 202	

CARGO SUMMARY		MISSION SEQUENCE: 67	STS-63	ORBITER OV-103
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>ATTACHED PLB PAYLOADS (CONT'D)</u> Gas Permeable Polymer Membrane Fluids Generic Bioprocessing Apparatus Protein Crystal Growth - Small Thermal Enclosure Sys Immunology Experiment National Institute of Health - Cells Radiation Monitoring Experiment - III Space Acceleration Measurement System Window Experiment Trajectory Control Sensor Cryogenic System Experiment Shuttle Glow - 2 Experiment IMAX Cargo Bay Camera	
19,108	2674	19,051		
<u>DEPLOYABLE PAYLOADS:</u> SPARTAN - 204 Deployed Wt. 2651 lb Retrieval Wt. 2617 lb ODERACS Deployed Wt. 23.0 lb			<u>CREW COMPARTMENT PAYLOADS:</u> Solid Surface Combustion Experiment Air Force Maui Optical Site	
<u>ATTACHED PLB PAYLOADS:</u> SPACEHAB - 3 Astroculture IV Bio Serve Pilot Laboratory Protein Crystallization Facility 3 Dimensional Microgravity Accelerometer Biological Research in Canisters Commercial Generic Processing Apparatus Charlotte Chromosome and Plant Cell Division in Space Commercial Protein Crystal Growth - Vapor Diffusion Apparatus Charged Particle Directional Spectrometer Cosmic Radiation Effects and Activation Monitoring Equipment for Controlled Liquid Phase & Sintering Experiment			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS 201 Payload Recorder	

CARGO SUMMARY		MISSION SEQUENCE: 68		STS-67	ORBITER OV-105
PAYLOAD-CHARGEABLE CARGO WEIGHT AT LIFT-OFF, LB	DEPLOYED P/L WEIGHT, LB	RETURNED CARGO WEIGHT, LB	<u>CREW COMPARTMENT PAYLOADS:</u> Middeck Active Control Experiment Protein Crystal Growth Experiments Commercial Materials Dispersion Apparatus Instrumentation Technology Associates Experiment Shuttle Amateur Radio Experiment - II		
20,250	0	20,250			
<u>DEPLOYABLE PAYLOADS:</u> None					
<u>ATTACHED PLB PAYLOADS:</u> Astro-2 Obervatory Instrument Pointing System (IPS) Hopkins Ultraviolet Telescope (HUT) Ultraviolet Imaging Telescope (UIT) Wisconsin Ultraviolet Photo-Polarimeter Experiment (WUPPE)			<u>GAS (Getaway Special):</u> G-387 - Ultraviolet Telescope G-388 - Ultraviolet Telescope		
			<u>SPECIAL PAYLOAD MISSION KITS:</u> RMS 303		